II. AMENDMENT TO THE CLAIMS

Any amendment/cancellation/addition of the claims herein as compared to the claims previously pending is made in order to streamline prosecution in this case by limiting examination and argument to certain embodiments of the invention that presently are considered to be of immediate commercial significance. Amended/new claims that may be construed as more limiting in scope than the scope of any of the claims prior to amendment/cancellation/addition should not be construed as an abandonment of any subject matter no longer claimed, nor should the amended/new claims be construed in any manner to waive or limit the equivalent structures of any element recited in such claims that would otherwise be available under the Doctrine of Equivalents with respect to the unamended/cancelled claims. Amendment/cancellation/addition of the claims is not in any manner intended to, and should not be construed to, waive Applicant's right in the future to the subject matter claimed in prior claims, or similar matter, whether in an equivalent, broader or narrower scope, in any continuation, divisional, continuation-in-part, RCE, CPA or any other application claiming priority to or through the present application. Applicant expressly reserves the right to file such applications directed to the subject matter included in any cancelled or previously submitted claim.

MARKED VERSION OF CLAIMS WITH PRESENT STATUS DELINEATED (next page)

Claims 1-40 (CANCELLED)

41. **(NEW)** A method of measuring a number of ions in a gaseous sample which method comprises:

(i) colliding said ions with uncharged particles having greater mass than said ions and transferring a charge from said ions to the uncharged particles so as to produce charged particles;

(ii) subjecting the charged and uncharged particles in an electric field and separating the charged particles from the uncharged particles; and

(iii) numerically measuring the number of charged particles.

42. **(NEW)** The method according to claim 41 wherein the gaseous sample is a steady flow of a gas comprising said ions, being combined and mixed with a steady flow of a gas comprising said uncharged particles, or nano-particles, or particle clusters, or molecules, or atoms; the combined flow being subjected to the electric field.

43. **(NEW)** The method according to claim 41 in which the number concentration of said uncharged particles is in excess of the number concentration of said ions.

44. **(NEW)** The method according to claim 41 in which the charged particles are detected and counted individually by means of a single particle counting means.

45 **(NEW)** The method according to claim 41 in which the uncharged particles are formed as an aerosol.

46. **(NEW)** The method according to claim 45 in which the aerosol is produced by an evaporator and a condensation means operatively configured to produce the uncharged aerosol particles.

47. **(NEW)** A method according to claim 41 in which the uncharged particles are a liquid in the form of a hydrosol or emulsion.

48. **(NEW)** The method according to claim 41 in which the numerical measuring of the particles is carried out by an optical particle counter, a light scattering or light absorption detector, a dust monitor, a nephelometer, an aethelometer or a condensation particle counter.

49. **(NEW)** A method according to claim 41 in which ions of pre-determined mobility are selected by means of an ion mobility selection unit and passed through the electric field to separate the charged particles from the uncharged particles.

50. **(NEW)** The method according to claim 41 in which said particles are passed through an ionization chamber comprising ionization means for effecting ionization of said particles and through the electric field to separate the charged particles from the uncharged particles.

51. **(NEW)** A method according to claim 41 for the detection of a trace species in a liquid or solid comprising:

a step of first evaporating a sample of said liquid or solid into a gas medium to be treated as a gaseous sample; or

a step of first heating a sample of said liquid or said solid to a predetermined temperature so as to release some of said trace species into a gas medium to be treated as a gaseous sample.

52. **(NEW)** A method according to claim 46 in which the charged aerosol particles or a detectable species thereof are increased in size and/or mass by subjecting the charged particles to a condensation process.

53. **(NEW)** The method according to claim 4l wherein the charged and uncharged particles are subjected to an electric field to separate the charged particles from the uncharged particles in a separation chamber comprising a differential mobility analyzer.

54. **(NEW)** The method according to claim 41 in which the charged particles impinge upon a detecting and numerical measuring means in a manner indicative of the magnitude of the respective charge.

55. **(NEW)** An apparatus for counting the number of ions in a gaseous sample which apparatus comprises:

(i) a mixing chamber;

(ii) a first inlet in the mixing chamber through which a gaseous sample comprising ions can enter;

(iii) a second inlet in the mixing chamber through which uncharged particles entrained in a gas can enter, the mixing chamber being operatively configured to facilitate collisions between the ions and the uncharged particles; and

(iv) an outlet from the mixing chamber so as to allow discharge of said particles into a separation chamber, which separation chamber comprises an electric field generating means and an outlet for discharging said separated particles into a charged particle detecting and numerical measuring means.

56. **(NEW)** An apparatus according to claim 55 in which the charged particle detecting and numerical measuring means comprises a single particle counting means, an optical particle counter, a light scattering or light absorption detector, a dust monitor, nephelometer, aethelometer or a condensation particle counter.

57. **(NEW)** An apparatus according to claim 55 in which the electric field generating means comprises two spaced apart electrodes with an electric field generated between them.

58. **(NEW)** An apparatus according to claim 55 in which there is an ion mobility selection unit attached to the inlet of the mixing chamber to enable ions of pre-determined mobility to pass into the mixing chamber.

59. **(NEW)** An apparatus according to claim 55 wherein an ionization chamber comprising an ionization means for effecting ionization of molecules or clusters of interest, is attached to the inlet of the mixing chamber.

60. **(NEW)** An apparatus according to claim 55 wherein a condensation unit, adapted to increase size and/or mass of the charged particles or a detectable species, is positioned between the separation chamber and the means for charged particle detection and numerical measurement.

61. **(NEW)** An apparatus according to claim 55 in which there is a charge neutralization

or charge removal means positioned before the second inlet to ensure the neutrality of particles flowing through the inlet.

62. **(NEW)** An apparatus according to claim 55 in which the separation chamber comprises a differential mobility analyzer.

63. **(NEW)** The apparatus according to claim 55 wherein an evaporator and, optionally, a condensation means are arranged to produce an uncharged aerosol of particles, or uncharged nano-particles, or neutral clusters, or molecules suspended in a gas medium, and connected to the second inlet to the mixing chamber.

64. **(NEW)** The apparatus according to claim 55 wherein a second outlet from said separation chamber is connected through a pump means and an aerosol filter means to a third inlet into said separating chamber, discharging from the mixing chamber in parallel with and adjacent to the inlet to said separating chamber.